

REMARKS

Reconsideration is respectfully requested in light of the above amendments and following remarks.

A. Status of the Claims / Explanation of Amendments

Claims 1-4 were pending. By this paper, claims 3 and 4 are cancelled without prejudice or disclaimer, and claim 1 is amended. The amendments to claim 1 are set forth above, and include, *inter alia*, the recitations:

- “said alloy resin ... forms a plurality of furrows and ridges alternately in a circumferential direction of said thin-walled steel pipe”
- “each of said ridges having a groove formed in an outer peripheral surface thereof and extending in said axial direction of said thin-walled steel pipe”
- “said crystalline engineering plastic coated over said grooves in respective ridges of said alloy resin has a thickness greater than that coated on other regions”
- “[said crystalline engineering plastic] forming a spline-shape in a uniform cross-section along an axial direction as a whole, said spline-shape is formed by furrows and ridges alternatively in a circumferential direction”

Support for these amendments is found throughout the application as original filed. [See, e.g., ¶¶0013 and 0022-25, Figure 1C (and its associated text)].

Claims 1-4 were rejected pursuant to 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,601,893 to Strassel (“Strassel”). [10/20/06 Office Action at p. 2]. The rejection of claims 3-4 is moot in light of their cancellation.

B. Claims 1 and 2 Are Patentably Distinct From Strassel

The rejection of claims 1-2 is respectfully traversed. Strassel does not fairly teach, disclose or suggest each and every element recited in Applicant's claim 1, and therefore cannot anticipate this claim.

Specifically, Applicant's claim 1 recites:

"1. A resin-coated steel pipe with superior mechanical strength, including an ability to slide comprising:
an alloy resin which is a mixture of a styrene-based resin and a crystalline engineering plastic is coated over an outer peripheral surface of a thin-walled steel pipe and is bonded thereto by an adhesive, and
said crystalline engineering plastic having a thickness necessary to exhibit a required mechanical strength, including said ability to slide, is coated over an outer peripheral surface of said coated alloy resin such that said resin-coated steel pipe has a double coated structure with a uniform cross-sectional form along an axial direction thereof,
said thin-walled steel pipe is circular in section; and
said alloy resin bonded and coated over said outer peripheral surface of said thin-walled steel pipe forms a plurality of furrows and ridges alternately in a circumferential direction of said thin-walled steel pipe, said furrows and said ridges extending in an axial direction of said thin-walled steel pipe such that said thin-walled steel pipe with said alloy resin coated thereon has a uniform cross-sectional form along an axial direction thereof, each of said ridges having a groove formed in an outer peripheral surface thereof and extending in said axial direction of said thin-walled steel pipe, said groove being capable of accommodating said crystalline engineering plastic with a thickness and width necessary to exhibit a required mechanical strength, including the ability to slide, and
said crystalline engineering plastic coated over said outer peripheral surface of said alloy resin having a thickness such that said crystalline engineering plastic coated over said

grooves in respective ridges of said alloy resin has a thickness greater than that coated on other regions, and forming a spline-shape in a uniform cross-section along an axial direction as a whole, said spline-shape is formed by furrows and ridges alternatively in a circumferential direction.”

Strassel is directed to a flexible metal pipes with a shrinkable polymer sheath. Most generally, Strassel discloses that a pipe (2) has a shrinkable polymer layer (9) and an intermediate elastomer layer (8). The shrinkable polymer layer is a polymer or mixture of polymers with a mold shrinkage greater than or equal to 0.3%, 1% or 3%, and preferably is a semicrystalline type material (e.g., polyamide). [5/12-56]. The intermediate elastomer layer is a thermoplastic elastomer and may be a styrene-based copolymer (e.g., SBS). [5/57-6/35]. In a disclosed modification, a “mixture” layer may be interposed between these two layers (8, 9), which is a blend of the materials in these two other layers (8, 9). [11/57-12/2].

In a first embodiment, the elastomer (8) is applied over the entirety of the metal pipe (2) and then, in turn, is covered by the shrinkable polymer (9):

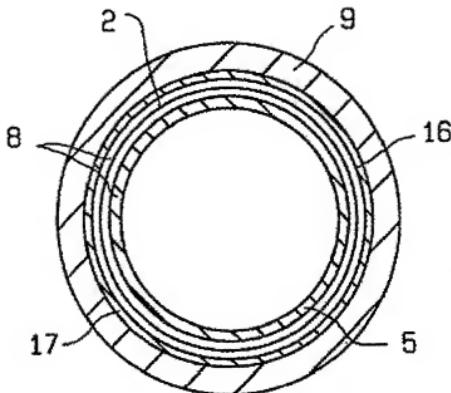


FIG. 2

The shrinkable polymer (9) has a constant thickness. [4/51-57].

In a second embodiment, the elastomer layer (8 or 8a) is applied only within interstices (5) formed by helical turns, e.g., outer cylindrical parts (13). [4/58-61; 9/41-54]. The shrinkable polymer layer (9) then is applied in a continuous fashion over the outer cylindrical parts (13) and the elastomer tape (8A). [9/23-27]. Such structures are shown in the cross-sectional views depicted in Figures 4 and 6 (cited by office action; reproduced below):

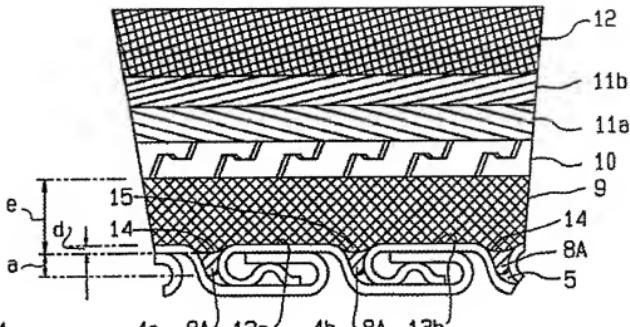


FIG. 4

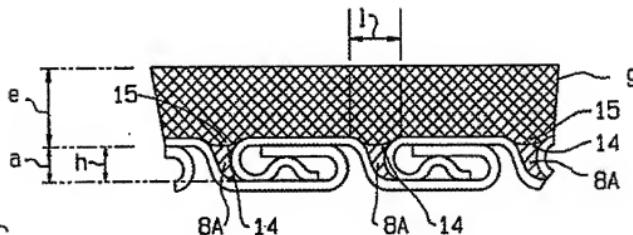


FIG. 6

In an un-depicted modification, an additional layer may be interposed between the elastomer layer (8 or 8a) and the shrinkable polymer layer (9). [11/57-12/2].

The office action asserted that Strassel anticipates claims 1-4 as follows:

“Strassel discloses the recited resin coated steel pipe comprising a steel thin walled corrugated pipe 2, a layer 8 formed of an elastomer which acts as an adhesive layer for the remaining layers, an addition[al] plastic layer can then optionally be provided above the elastomer layer, and an alloy resin material 9 is placed over the top of all layers and is formed of a material that is a mix of a crystalline material with a styrene based resin ... *the alloy material of layer 9 can extend into the grooves, which is spline shaped based upon the definition of spline being a thin metal strip of which Strassel is formed* (see Websters 10th Edition Collegiate Dictionary).”¹ [10/20/06 Office Action at p. 2 (emphasis added)].

This statement is understood to be an assertion that the polymer sheath (9) corresponds to the “crystalline engineering plastic” recited in Applicant’s claim 1, an undepicted “mixture” or additional layer of the polymer sheath (9) and the elastomer tape (8A) corresponds to the “alloy resin” recited in Applicant’s claim 1, and the elastomer layer (8A) corresponds to the “adhesive” recited in Applicant’s claim 1. [10/20/06 Office Action at pp. 2 and 3].

Applicant respectfully submits that there are at least several distinctions between Strassel and Applicant’s claim 1. First, the “mixture” or additional layer cannot correspond to Applicant’s “alloy resin,” because the “mixture” layer does not have a plurality of furrows and ridges, and axially extending grooves formed in outer peripheral surfaces of the ridges as recited in Applicant’s claim 1. Second, the polymer sheath (9)

¹ Applicant does not have the particular dictionary cited by the office action, and therefore cannot comment on the accuracy of the definition relied upon by the office action at page 2. Applicant notes, however, that a thin metal strip is not recited in Applicant’s claim 1, which has a circular, metal pipe that is coated with two plastic/polymer resins. This disparity suggests that the definition found by the office action may not be entirely appropriate. Applicant expressly reserves the right to assert that another definition may be more appropriate.

cannot correspond to Applicant's "crystalline engineering plastic," because Strassel's polymer sheath does not have a spline shape formed by furrows and ridges as recited in Applicant's claim 1. Each of these distinctions is discussed in turn below.

1. Strassel's "Mixture" Layer Does Not "Form[]A Plurality Of Furrows And Ridges Alternately In A Circumferential Direction Of Said Thin-Walled Steel Pipe ... Each Of Said Ridges Having A Groove Formed In An Outer Peripheral Surface Thereof And Extending In Said Axial Direction Of Said Thin-Walled Steel Pipe" As Recited In Applicant's Claim 1
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Strassel's "mixture" layer is alleged by the office action to correspond to the alloy resin of Applicant's claim 1. Strassel describes that this "mixture" layer is applied between the elastomer (8 or 8a) and the shrinkable polymer (9):

"Within the framework of this invention, and for the purpose of strengthening the adhesion between the elastomer and the shrinkable polymer, a certain amount of shrinkable polymer can be added to the intermediate elastomer layer and/or a certain amount of elastomer can be added to the shrinkable polymer prior to their extrusion for instance by one or the other of the methods described above. One can also interpose between the intermediate elastomer layer and the shrinkable polymer sheath a layer consisting of a mixture of elastomer and shrinkable polymer, which can be accomplished for instance by coextruding a three-layer sheath of elastomer/elastomer+shrinkable polymer/shrinkable polymer." [11/57-12/2].

This paragraph is the only disclosure Applicant could find regarding the "mixture" layer. There is no discussion in this paragraph (or elsewhere in Strassel) that this "mixture" layer has furrows or ridges. There is no discussion in Strassel that each of the ridges has a groove formed in an outer peripheral surface thereof. There is no discussion of its thickness at all. There is no figure, which depicts its structure.

Accordingly, there is no teaching, disclosure or suggestion that the “mixture” layer of Strassel “forms a plurality of furrows and ridges alternately in a circumferential direction of said thin-walled steel pipe . . . each of said ridges having a groove formed in an outer peripheral surface thereof and extending in said axial direction of said thin-walled steel pipe” as recited in Applicant’s claim 1.

2. Strassel’s Polymer Sheath Is Not “Coated Over Said Outer Peripheral Surface Of Said Alloy Resin” To “Form[] A Spline-Shape In A Uniform Cross-Section Along An Axial Direction As A Whole, Said Spline-Shape Is Formed By Furrows And Ridges Alternatively In A Circumferential Direction” As Recited In Applicant’s Claim 1

Strassel’s polymer sheath or shrinkable polymer layer (9) is alleged by the office action to correspond to the crystalline engineering plastic of Applicant’s claim 1.

Strassel’s shrinkable polymer layer (9) has a constant thickness in his first embodiment. [4/51-57; Figure 2]. It cannot be disputed that, in this first embodiment, the shrinkable polymer layer (9) does not “form[] a spline-shape in a uniform cross-section along an axial direction as a whole, said spline-shape is formed by furrows and ridges alternatively in a circumferential direction” as recited in Applicant’s claim 1.

In Strassel’s second embodiment (expressly relied upon by the office action), the shrinkable polymer layer (9) also has a relatively constant thickness (e). Strassel says that the “ideal configuration” would be “perfectly cylindrical.” [9/50-52]. Indeed, the exterior surface of the shrinkable polymer layer (9) is shown as being smooth. Strassel discloses, however, that “slight” indentations (14) or bulges (15) may be present on the interior surface of the shrinkable polymer layer (9) adjacent to the elastomer tape

(8a). [9/50-63; Figures 4-6]. Preferably, these irregularities in the outer surface (14) of the elastomer layer (8a) are in the form of a hollow like a meniscus whose concave side faces toward the outside as illustrated in Figures 4 and 6. [9/55-57].

The bulges (15) shown in Figures 4 and 6 were asserted by the office action to correspond to the spline-shape recited in Applicant's claim 1.

These irregularities, however, are only present at the interface of the elastomer layer (8a) and the shrinkable polymer layer (9) and are not formed over the outer peripheral surface of the shrinkable polymer layer (9), which is alleged to correspond to the "crystalline engineering plastic" recited in Applicant's claim 1. Thus, Strassel fails to teach, disclose or suggest that the shrinkable polymer layer (9) is "coated over said outer peripheral surface of said alloy resin ... forming a spline-shape in a uniform cross-section along an axial direction as a whole...."

Moreover, the effect of the additional "mixture" layer being interposed between the shrinkable polymer layer (9) and the elastomer layer (8) is not discussed in Strassel or in the office action. It is unclear to Applicant whether such irregularities will, in fact, be present in the embodiment identified by the office action. Strassel is silent on this subject. Nor has the office action provided a technical explanation for believing that such irregularities would be present in the shrinkable polymer layer (9) after the "mixture" layer has been interposed.

Further still, the bulges (15) of the shrinkable polymer layer (9) are present only adjacent to the elastomer tape (8a). [Figures 4 and 6]. The elastomer tape (8a) has a

helical structure (i.e., it is within the interstices formed by the helical outer cylindrical parts (13)). As such bulges (15) would have a helical structure due to the helical structure of the elastomer tape (8a), although not expressly described by Strassel. Accordingly, along the axial direction there would be differing pipe cross-sections. For example, the location of the bulges (15) would differ owing to the helical structure of the bulges (15).

Yet further still, these bulges (15) are not formed by furrows and ridges alternatively in a circumferential direction.

In sum, Strassel fails to teach, disclose or suggest “said crystalline engineering plastic coated over said outer peripheral surface of said alloy resin ... and forming a spline-shape in a uniform cross-section along an axial direction as a whole, said spline-shape is formed by furrows and ridges alternatively in a circumferential direction.”

Because of the above-described deficiencies, Applicant’s independent claim 1 is asserted to be patentably distinct from Strassel. Dependent claim 2 also is asserted to be in condition for allowance for at least similar reasons.

Applicant has chosen in the interest of expediting prosecution of this patent application to distinguish the cited documents from the pending claims as set forth above. These statements should not be regarded in any way as admissions that the cited documents are, in fact, prior art. Likewise, Applicant has chosen not to submit evidence to traverse the rejection at this time. Applicant, however, reserves the right, as provided

by 37 C.F.R. § 1.132, to do so in the future as appropriate. Finally, Applicant has not specifically addressed the rejections of the dependent claims. Applicant respectfully submits that the independent claims, from which they depend, are in condition for allowance as set forth above. Accordingly, the dependent claims also are in condition for allowance. Applicant, however, reserves the right to address such rejections of the dependent claims in the future as appropriate.

CONCLUSION

For the above-stated reasons, this application is respectfully asserted to be in condition for allowance. An early and favorable examination on the merits is requested. In the event that a telephone conference would facilitate the examination of this application in any way, the Examiner is invited to contact the undersigned at the number provided.

THE COMMISSIONER IS HEREBY AUTHORIZED TO CHARGE ANY ADDITIONAL FEES WHICH MAY BE REQUIRED FOR THE TIMELY CONSIDERATION OF THIS AMENDMENT UNDER 37 C.F.R. §§ 1.16 AND 1.17, OR CREDIT ANY OVERPAYMENT TO DEPOSIT ACCOUNT NO. 13-4500, ORDER NO. 4746-4000.

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